

REMARKS/ARGUMENTS

Claims 15-25 were previously pending in the application. Claims 21-25 are canceled; and new claims 26-30 are added herein. Assuming the entry of this amendment, claims 15-20 and 26-30 are now pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

In paragraph 2 of the final office action, the Examiner rejected claims 15-16 and 18 under 35 U.S.C. 102(e) as being anticipated by Ella. In paragraph 7, the Examiner rejected claim 17 under 35 U.S.C. 103(a) as being unpatentable over Ella in view of Ketcham. In paragraph 9, the Examiner rejected claims 19 and 21-24 under 35 U.S.C. 103(a) as being unpatentable over Ella in view of Chason. In paragraph 15, the Examiner rejected claims 20 and 25 under 35 U.S.C. 103(a) as being unpatentable over Ella in view of Chason in view of Fischer. For the following reasons, the Applicant submits that all of the now-pending claims are allowable over the cited references.

Claim 15

According to previously presented claim 15, the piezoelectric layer spans the cavity in the substrate to form a suspended membrane portion of the piezoelectric layer. The Applicant submits that Ella does not teach a piezoelectric device having such a feature.

According to the Examiner, Figs. 2 and 4 of Ella show piezoelectric devices having a piezoelectric layer that "spans a cavity to from [sic] a suspended membrane portion of the piezoelectric layer." See paragraph 3 of the office action. The Applicant respectfully submits that the Examiner mischaracterized the teachings in Ella in rejecting claim 15.

According to the Merriam-Webster Online Dictionary (i.e., <http://www.m-w.com/dictionary/suspended>), "suspend" means "to hang so as to be free on all sides except at the point of support." Fig. 5B of the present application shows an example of a piezoelectric layer that spans a cavity to form a suspended membrane portion of the piezoelectric layer. In particular, piezoelectric layer 222 is supported by substrate 220 on opposite sides of the cavity formed within substrate 220, while the middle portion of piezoelectric layer 222 is not supported by substrate 220 or any other structure. In that sense, piezoelectric layer 222 spans the cavity in substrate 220 to form a suspended membrane portion corresponding to that middle portion of the piezoelectric layer.

As described in column 1, lines 48-57, Ella's Fig. 2 shows a bulk acoustic wave resonator having a bridge structure, where membrane 130 is deposited on substrate 200. The resonator further comprises a bottom electrode 110 on the membrane, a piezoelectric layer 100, and a top electrode 120, where a gap 210 is created between the membrane and the substrate. Thus, in Fig. 2, membrane 130 spans a cavity (i.e., the gap) to form a suspended membrane portion, but membrane 130 is not a piezoelectric layer. As such, membrane 130 is not an example of the piezoelectric layer of claim 15.

While it is true that layer 100 is a piezoelectric layer, piezoelectric layer 100 does not span a cavity to form a suspended membrane portion. Rather, piezoelectric layer 100 is fully supported by other structure (i.e., in part by membrane 130 and the rest by bottom electrode 110). As such, there is no portion of piezoelectric layer 100 that constitutes a suspended membrane portion spanning a cavity. Piezoelectric layer 100 therefore is also not an example of the piezoelectric layer of claim 15.

Similarly, as described in column 2, line 61, to column 3, line 3, Ella's Fig. 4 shows almost an identical structure, except that the gap in Fig. 2 is, in Fig. 4, a via-hole 211 etched through the whole substrate. In any case, the fact remains that, as in Fig. 2, in Fig. 4, non-piezoelectric membrane layer 130

spans a cavity (i.e., in this case, via-hole 211) to form a suspended membrane portion, while piezoelectric layer 100 does not.

For all these reasons, the Applicant submits that claim 15 is allowable over Ella. Since the rest of the claims depend variously from claim 15, it is further submitted that those claims are also allowable over Ella.

New Claims 26-30

Support for new claims 26-30 is found in Fig. 5B and paragraph [0042] in the specification. Each of claims 26-30 recites structural features that further distinguish the claimed invention over the teachings in the cited references.

In particular, according to claims 26 and 30, the piezoelectric layer is in direct contact with the substrate on opposing sides of the cavity. In Figs. 2 and 4 of Ella, piezoelectric layer 100 is not in direct contact with substrate 200 at all, let alone in direct contact on opposing sides of the cavity. In Fig. 2C.2 of Ketcham, piezoelectric layer 30 is in direct contact with substrate 32 on only one side of the cavity. See column 4, line 25, to column 5, line 26.

According to claims 27 and 30, all support for the piezoelectric layer is provided directly by the substrate without any intervening structure. In Figs. 2 and 4 of Ella, support for piezoelectric layer 100 is provided directly by membrane 130 and bottom electrode 110 and not directly by substrate 200 at all. In Fig. 2C.2 of Ketcham, some support for piezoelectric layer 30 is provided directly by substrate 32, but not all support, because other support for piezoelectric layer 30 is provided by electrode M2.

According to claims 28 and 30, the at least one conducting element mounted on the inner side extends within the cavity beyond the surface of the inner side. In Figs. 2 and 4 of Ella, bottom electrode 110 does not extend within the cavity at all. In Fig. 2C.2 of Ketcham, electrode M2 does not extend within the cavity beyond surface 44 of piezoelectric layer 30.

According to claim 29, the at least one conducting element mounted on the inner side is not in direct contact with the substrate. In Fig. 2C.2 of Ketcham, electrode M2 is in direct contact with substrate 32.

Neither Chason, Fischer, nor Kaitila provide the features missing from Ella and Ketcham.

Each of these claims provides additional reasons for the allowability of the claimed invention over at least some if not all of the cited prior art references.

In view of the foregoing, the Applicant respectfully submits that the rejections of claims under Sections 102(e) and 103(a) have been overcome.

In view of the above amendments and remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

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